Specification
342. CRITICAL AREA PLANTING (Acre)

Critical area planting specifications are divided into four subsections based on the type of vegetation to be established:

Temporary cover

Permanent cover-seeding

Permanent cover-sodding

Permanent cover-planting trees, shrubs, vines and crowns

Permanent cover-planting shrubs on streambanks

1. Temporary cover

Mulching -Use if the period of exposure is less than two months, temporary vegetation is not feasible or where seeding is delayed because of weather conditions. Follow standard and specification for Mulching (484).

2. Annual Grass or Grain. Use on all sediment producing areas where the period of exposure will be more than two months, but less than 12 months.

a. Site Preparation:

(1) Install needed water control measures (temporary or permanent).

(2) Perform all cultural operations at right angles to the slope on slopes 3:1 or flatter.

(3) Apply agricultural lime according to soil test, or at the rate of 8,000 pounds per acre (200 pounds per 1,000 square feet) on a 100 percent calcium carbonate equivalent basis as a preliminary application and test the soil. Apply the balance recommended by the test when the results are received. If lime is to be worked into a depth of five inches or deeper, use amount recommended on the soil test report. Apply no more than 8,000 pounds per acre at one time if limestone is to be surface applied or worked into a depth of four inches or less. Apply the balance of the recommendation as the lime dissolves and works into the soil.

Where pH levels are extremely low, it may not be feasible or practical to apply the lime all at once. In these cases, apply 6,000 pounds per acre (150 pounds per 1,000 square feet) on a 100 percent calcium carbonate equivalent basis of agricultural lime for the temporary cover and the remainder required with the permanent cover.

(4) Apply fertilizer according to soil test, or apply 40 pounds each of N, $P_2 0_5$ and $K_2 0$ per acre (1 pound each per 1,000 square feet) as a preliminary application and test the soil. Apply the balance recommended by the test when the results are received.

b. Establishment:

(1) Seed using one of the species or mixtures listed in Table 1.

(2) Cover grass seeds with 1/4 inch of soil by drilling, cultipacking, harrowing or other suitable equipment when site conditions permit; cultipack or track hydroseeded areas where slopes allow.

(3) Cover small grain with 1 -1 1/2 inches of soil when site conditions permit; cultipack or track hydroseeded areas where slopes allow.

(4) Mulch all areas according to the standard and specification for Mulching (484).

2 Permanent Cover -Seeding

a. Site Preparation:

(1) Install needed water control and sediment retention measures (permanent or temporary).

(2) Perform all cultural operations at right angles to the slope on slopes 3: 1 or flatter.

(3) Where site conditions permit, prepare seedbed by loosening the soil to a depth of two to six inches with suitable equipment. Where site conditions will not permit normal seedbed preparation, loosen surface soil by dragging heavy chain or other suitable equipment over area to be seeded. On mined land the surface should be left furrowed, where possible (as left by ripper teem spaced 12 inches to 18 inches apart), when seeding herbaceous plants.

(4) Apply agricultural lime according to soil test or at the rate of 8,000 pounds per acre (200 pounds per 1,000 square feet) on a 100 percent calcium carbonate equivalent basis as a preliminary application and test the soil. Apply the balance recommended by the test when the results are received. If lime is to be worked into a depth of five inches or deeper, use amount recommended on the soil test report. Apply no more than 8,000 pounds per acre if limestone is to be surface applied or worked into a depth of four inches or less.

Where pH levels are extremely low, it may not be feasible or practical to apply the lime all at once. In these cases, apply the agricultural lime in 6,000-pound increments and incorporate it before the next increment.

(5) Apply nitrogen only when the plants will be actively growing during the period immediately following the application (March- May and August-October for cool season grass, June-August for warm season grass). On remote sites with poor access (RAMP, PL-566, PL-216) for regular fertilization, apply all nitrogen as slow release compounds (ureaformaldehyde, sulfur-coated urea, IBDU, animal manure, or sewage sludge), and no more than 80 pounds of actual nitrogen per acre (2.0 pounds per 1,000 square feet) in one application. On sites with good access (CO-01) for regular fertilization, apply forty percent of the nitrogen as slow release compounds, and no more than 40 pounds of actual nitrogen per acre (1.0 pound per 1,000 square feet) in one application.

Apply fertilizer according to soil test, or:

(a) Where a seedbed is prepared, apply 100 pounds each of actual P_20_5 and K_20 per acre (2.5 pounds each per l,000 square feet) during seedbed preparation and at time of seeding. Apply 100 pounds of actual P_20_5 and 100 pounds actual K_20 per acre (2.5 pounds of actual P_20_s and 2.5 pounds of actual K_20 per 1,000 square feet) as a preliminary application.

Apply 40 pounds of actual N per acre (1 pound per 1,00) square feet) during the first period of active growth following the seeding.[1] Test the soil before application and apply the balance recommended by the test when the results are received. Apply maintenance fertilizer the following growing season according to a soil test.

(b) Where seedbed cannot be prepared, 80 pounds of Actual actual K_20 per acre (2 pounds of actual P_20_5 and 2 pounds of actual K_20 per 1,000 square feet) at time of seeding. Apply 40 pounds of actual N per acre (1 pound per 1,000 square feet) during the first period of active growth following the seeding.

Apply maintenance fertilizer the following growing season according to a soil test. If legumes are hydroseeded, use four times the normal amount of inoculant added to the slurry just before seeding. Apply lime and fertilizer by any method that will give uniform distribution.

b. Establishment

(1) Where seedbed is prepared:

(a) Smooth and firm seedbed with cultipacker or other similar equipment prior to seeding.

(b) Apply seeds of one of the species or mixtures listed in Table 2 as a permanent cover from Table 1 as a nurse crop. Apply uniformly by drilling, broadcasting or hydroseeding.

(c) Cover grass and legume seeds with 1/4 inch of soil when broadcasted or drilled. Cultipack or track with a bulldozer where slopes allow.

(d) Mulch all areas according to standard and specifications for Mulching (484).[2]

(2) Where seedbed is not prepared:

(a) Apply seeds of one of the species or mixtures listed in Table 2 as a permanent cover and one from Table 1 as a nurse crop. Apply uniformly by broadcasting or hydroseeding. Cultipack or track with a bulldozer where slopes allow.

(b) Mulch all areas according to standard and specifications for Mulching (484).[2]

(3) Where it is essential to get quick vegetative cover to prevent gullying, use "Sodding." See Section 3 on this page.

c. Management of Vegetation

(1) For forage, manage according to the standard and specifications for Pasture and Hayland Management (510).

(2) For wildlife, manage according to the standard and specifications for Wildlife Upland Habitat Management (645).

(3) For all other uses, control brush and weeds by mowing or by the use of herbicides.[3] Where site conditions permit, mow, as needed, to maintain stand of desired vegetation.

d. Lime and Fertilizer for Maintenance of Vegetation

(1) For forage, lime and fertilize according to standard and specifications for Pasture and Hayland Management (510).

(2) For all other uses:

Lime according to soil test every three years. Fertilize to maintain a dense vegetative cover. Apply fertilizer according to soil test. If soil test results are not available, apply:

Where grasses predominate, broadcast 60 pounds each of actual N, P_20_5 and K_20 per acre (1.5 pounds each per 1,000 square feet) during the growing season to maintain desired cover. The N should be applied as ureaformaldehyde, sulfur-coated urea, or IBDU.

Where legumes predominate, broadcast every three years or as needed, 60 pounds each of actual P_20_5 and K_20 per acre (1.5 pound each per 1 ,000 square feet) during the growing season to maintain desired cover.

3 Permanent Cover -Sodding

a. Site Preparation

(1) Install needed water control and sediment retention measures (temporary or permanent).

(2) Prepare area, lime and fertilize the same as outlined for Permanent Cover Section 2. a.

(3) Loosen soil surface to a depth of three inches and dampen before laying sod.

b. Selection

(1) Select sod grown from certified seed of adapted varieties and under cultural practices conducive to high quality sod that will be free of any serious thatch, weeds, insects, diseases or other pest problems.

(2) Select species and varieties best suited for the sites to be planted and purpose for which turf is to be used. Use varieties tested and approved by State Experiment Stations.

(3) Select sod at least one-year old and no older than three years. Cultivated turfgrass is usually considered ready for harvest when a cut portion of sod three feet in length and about 1 1/2 feet in width will support its own weight. The most common age of sod when cut is 15 to 24 months.

(4) Select sod cuts of a width and length suited to the equipment and job. Generally, sod cuts are from 12 to 24 inches wide with 12 inches being the most common width. Lengths of cuts vary from 3 to 8 feet. Sod may be cut and rolled or folded in the middle and stacked on pallets. Folded sod is cut shorter (about 3 to 4 feet) than rolled sod. Sod should be cut with a 1/2- to 1-inch layer of soil. About 80 percent of all rhizomes are in the top 3/4-inch of soil. The thinner the sod is cut (1/2- to 3/4-inch), the more quickly it will knit to the site soil.

(5) Deliver sod to the site as soon as practical after lifting. During hot weather, delivery should be made within six hours and may be extended to 48 hours during cool seasons. It is not recommended to move sod during July and August. If moved during this period, sod

may need to be cut 1 1/4 inches thick, and it will require intensive care.

c. Establishment

(1) Lay strips of sod at right angles to direction of slope or flow of water, starting at the lowest elevation. Wedge the edges and ends of the sod strips together and tamp or roll. Stagger joins. Make the edges of the sod strips flush with the edges of the undisturbed ground.

(2) On very steep slopes use wire staples, fine mesh wire or wood pins and binder twine to hold sod in place, until secured by plant growth.

(3) Irrigate sodded area if dry conditions prevail. It is desirable to irrigate area from which sod is to be removed prior to lifting.

d Manage and maintain as follows:

(1) Lime according to soil test every five years.

(2) Top-dress annually or as needed to maintain desired cover with fertilizer at the rate of 60 pounds each of actual N, actual P_20_5 and actual K_20 per acre (1.5 pounds each per 1,000 square feet). The N should be applied as ureaformaldehyde, sulfur-coated urea or IBDU.

(3) Mow as necessary for land use and weed population to control undesirable growth.

4. Permanent Cover -Planting Trees, Shrubs, Vines and Crown Vetch Crowns.

a. Site Preparation

(1) Same as 2. a. (1).

(2) Same as 2. a. (2)

(3) Same as 2. a. (3).

(4) Apply lime at the rate of 4,000 pounds per acre on a 100 percent calcium carbonate basis over the area to be planted.

(5) Apply fertilizer at the rate of 40 pounds of actual P_20_5 and 40 pounds of actual K_20 per acre (1 pound per 1,000 square feet) at time of seeding. Apply 40 pounds of actual N per acre (1 pound per 1,000 square feet) during the first period of active growth following the seeding. When strip-seeding, apply all of the fertilizer in the herbaceous strips. Follow-up with the same rate the following growing season over the entire area.

b. Selection species according to site and planned use.

(1) Trees and shrubs adapted for wind or water erosion control planting:

Selection of the proper species is the key in reclaiming critical areas. Tree species may be selected from Table 3. Shrub and vine species may be selected from Table 4. Select species according to site and planned use. When tree planting is mainly for ~ products, refer to the Tree Planting Standard and Specifications (612).

(2) Trees, shrubs and vines for erosion control on recreation, suburban and urban areas:

Select adapted species of trees, shrubs and vines from "Guide for Recreation and Urban Planting in Pennsylvania." Crown vetch crowns may be used in place of vines where adapted.

c. Establishment

(1) Plant woody species in combination with herbaceous species on highly erosive sites. Seed the herbaceous species in strips with woody species planted between strips. When strip - seeding, leave a 24-inch wide strip for woody species between strips of herbaceous plants. Orient strips on the contour if site conditions permit.

(2) Follow recommendations contained in Information Sheet PA-23, "How to Plant Trees and Shrubs." Plant conifers at the rate of 680 per acre (spacing 8 x 8 feet), deciduous trees at the rate of 435 per acre (spacing 10 x 10 feet), and shrubs at the rate of 2,700 per acre (spacing 4 x 4 feet). Plant vines and crowns at the rate of 4,840 per acre (spacing 3 x 3 feet).

(3) Protect root systems from drying by treating the roots with a moisture-retaining gel immediately after digging or arrival at the planting site.

(4) Where slopes are steep and infertile, excavate hole or planting seedlings, vines or crowns 10 to 12 inches in diameter and 2 inches deeper than root zone, then refilled with topsoil. Apply approximately one ounce of 10-10-10 fertilizer to each hole and thoroughly mix with the topsoil before planting. Mulch the area between plants with straw, bark, plastic or commercial mulch.

d. Protection

Protect planted areas from trampling, browsing, grazing and fire.

5. Permanent Cover -Planting Shrubs on Streambanks

a. Site Preparation

(1) Install needed water control and sediment retention measures (temporary or permanent).

(2) Grade streambank to a 2 to 1 slope or flatter.

(3) Install Structural slope protection measures (shrubs will only tolerate an 8-foot per second velocity).

(4) Lime and fertilize the site according to the specification in Section 2 Permanent Cover-seeding.

b. Establishment

(1) Plant two rows of shrubs for streambank protection; one at the normal waterline and one immediately upslope from it.

(2) Plant woody species in combination with a herbaceous ground cover mixture. Do not use mixtures with crown vetch, flatpea or perennial pea with streambank shrubs. Red fescue and dwarf varieties of perennial rye grass are preferred for the least competitive ground covers.

(3) Select shrubs from the list below. All are adapted to planting sites from the normal waterline upslope to the top of the streambank. They are not adapted to excessively drained soils unless moisture from the stream keeps the root zone wet.

'Streamco' purpleosier willow (Salix purpurea)
'Bankers' dwarf willow (Salix x cotteti)
'Ruby' redosier dogwood (Cornus stolonifera)
Common sandbar willow (Salix interior)
Common river alder (Alnus serrulata)

(4) Planting may be done by unrooted cuttings, rooted cuttings, seedlings, or wattles (bundles of long unrooted cuttings) depending on the species.

Purpleosier willow -unrooted cuttings, rooted cuttings, wattles

Dwarf willow -unrooted cuttings, rooted cuttings, wattles

Redosier dogwood -unrooted cuttings, rooted cuttings, wattles

Sandbar willow -unrooted cuttings, rooted cuttings, wattles

River alder -seedlings

(5) Unrooted cuttings will be made before March 1 and stored at 40°F until planting. They will be planted as early as possible but before May 1. Diameter of the cutting will be 1/4 - 1/2 inch. Length will be a minimum of 9 inches. Planting may be done by pushing the cutting into the soil, or putting it in a dug hole at least 6 inches deep. Cuttings will be spaced no more than 1 foot apart in rows no more than 2 feet apart.

(6) Rooted cuttings will be grown for a year from unrooted cuttings as specified in (4) above. Rooted cuttings will be dug before the buds swell in the spring and stored at 40°F unless planted immediately. Length of the cutting above the roots will be a minimum of 12 inches. Root systems will be protected from drying by treating the roots with a moisture-retaining gel immediately after digging or arrival at the planting site. Planting will be done by putting it in a dug hole to the top of die roots. Cuttings will be spaced no more than 2 feet apart in rows no more than 2 feet apart.

(7) Seedlings will be at least one year old. They will be dug before the buds swell in the spring and stored at 40°F unless planted immediately. Length of the seedling above the roots will be a minimum of 12 inches. Planting will be done by putting it in a dug hole to the top of the roots. Seedlings will be spaced no more than 2 feet apart in rows no more than 2 feet apart.

(8) Wattles will be made before March 1 and stored at 40°F until planting. They will be planted as early as possible but before May 1. Diameter of the cuttings used in the wattles will be 1/4 to 1/2 inch. Diameter of the bundle will be a minimum of 4 inches. The bundles may be any length but 3 to 6 feet is most practical. The bundles will be tied at a maximum of 18 inches apart. The wattles will be planted in a continuous trench an inch deeper than the diameter of the wattle. The trenches will be 3 feet apart. The trenches will be covered immediately after planting.

c. Management

(1) Protect the planting from grazing.

(2) Replace dead plants as quickly as possible.

(3) Remove fallen tree limbs and trash washed up on die planting immediately.

(4) Do not lime and fertilize after die establishment year. It would help the groundcover compete with the shrubs.

[1]Cattle manure or sewage sludge can be used to meet the nutrient requirements and will add needed organic matter needs when they can be incorporated into the soil. Heavy metal content of sewage sludge should not exceed that allowed on agricultural lands.

[2] Annual grains such as barley, oats or rye can be grown on some sites and a seeding made in the standing stubble in lieu of mulching.

[3]Persons using chemical herbicides should be cautioned as follows: Herbicides should be handled and applied properly and unused portions disposed of safely to avoid injury to humans, domestics animals, desirable plants, fish, and other wildlife, and damage to crops and other vegetation. Follow the directions and heed all the precautions on the container label. Herbicides should not be used over or directly adjacent to ponds, lakes or streams.

MIXTURES FOR VARIOUS SITES
For use with Table 2

Slopes and Banks (non-mowed)

(a) Well drainage -3, 4, 5, 6, 7, 8, 9, 10, 11
(b) Variable drainage -3, 7, 9

Slopes and Banks (mowed) -1, 2, 14

Gullies and Eroded Areas -3, 4, 5, 7, 8, 9, 10, 11

Conservation Structures

(a) Sod waterways, spillways and other frequent waterflow areas -1, 2, 3, 6, 7
(b) Drainage ditches

1. Shallow, less than 3 feet -1, 2, 3, 6, 7

2. Deep, non-mowed -6, 7, 8, 9, 10, 11

(c) Pond banks, dikes, levees, darns, diversion channels and occasional waterflow area.

1. Mowed areas –1, 2, 3, 4, 5, 14

2. Non-mowed areas -6, 7, 8, 9, 10, 11

3. Hay or silage on diversion channels and occasional waterflow areas -use adapted hay mixtures or 12, 13

Sanitary landfill areas -3, 4, 5, 8, 9, 15, 16, 17, 18

Mine spoils -3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18

Wildlife Habitat –6, 7, 12, 13, 15, 16, 17, 18

Effluent Disposal Areas -6, 7, 13, 15, 16

Sand and Gravel Pits -15, 16, 17, 18